into groups still larger, naturalists adopted certain general terms expressive of the successively more comprehensive divisions; and the habitual use of these terms, needful for purposes of convenience, has led to the tacit assumption that species, genera, orders, and classes, are assemblages of definite values—that every genus is the equivalent of every other genus, in respect of its degree of distinctness; and that orders are separated by lines of demarcation that are as broad in one place as another. Though this conviction is not a formulated one, yet the disputes continually arising among naturalists on the questions, whether such and such organisms are specifically or generically distinct, and whether this or that peculiarity is or is not of ordinal importance, imply that the conviction is entertained even where it is not avowed. And this is equally shown by the impossibility of obtaining any definition of the degree of difference, which warrants each further elevation in the hierachy of classes.

"It is, indeed, a wholly gratuitous assumption that organisms admit of being placed in groups of equivalent values; and that these may be united into larger groups that are also of equivalent values; and so on. There is no *à priori* reason for expecting this; and there is no *à posteriori* evidence implying it, save that which begs the question—that which asserts one distinction to be generic and another to be ordinal, because it is assumed that such distinctions must be either generic or ordinal. The endeavour to thrust plants and animals into these definite partitions, is of the same nature as the endeavour to thrust them into a linear series. Not that it does violence to the facts in anything like the same degree; but still it does violence to the facts. Doubtless the making of divisions and sub-divisions, is extremely useful; or rather, it is absolutely necessary. Doubtless, too, in reducing the facts to something like order, they must be partially distorted. So long as the distorted form is not mistaken for the actual form, no harm results. But it is needful for us to remember, that while our successively subordinate groups have a certain general correspondence with the realities, they inevitably give to the realities a regularity which does not exist."—Hy.J.T.

A definition of the Satyrid Genera; Erebia, Callerebia, Paralasa and Erebomorpha.

By B. C. S. WARREN, F.E.S.

The separation of species into genera, is a matter on which opinions seem to differ more often than not; and those species generally included in the genera *Erebia* and *Callerebia* have been dealt with in a variety of ways by various authors, notwithstanding the fact that the European Erebias and their Asiatic relatives form such a perfectly natural group. Seitz states (*Macrolep.* Vol. I. p. 93) that modern authors are uniting *Erebia* and *Callerebia* as being too similar to maintain as separate genera; and he (or rather Eiffinger) includes *Paralasa* in *Erebia*. I suppose my inclination is to side with the "splitter" rather than the "lumper" in this matter, but I certainly cannot feel satisfied with generic divisions unless they can be clearly defined on a structural basis. Dr. Chapman in his work on the Genus *Erebia* (*Trans. Ent. Soc. Lond.* 1898) did not conclusively deal with the question of genera;

but be noted that the "sickle" in *Erebia* and neighbouring genera, might be taken as offering generic characters, and the clasp specific ones. This statement can only be held as partially correct, and I feel sure he did not intend it to be taken too literally. As a matter of fact, he seems to have been troubled by it a good deal himself, and in consequence of it he failed to recognise the great value of the features of the uncus for the purposes of specific differentiation. Now it is perfectly true that single characters of the genitalia do exhibit generic features, at times to such an extent that one can readily recognise a given genus by such a character alone, but even so, I have no doubt that a true generic definition can only be arrived at from a consideration of a number of characters. By this I do not mean that a generic definition cannot be based on the genitalia alone, for on the contrary I feel sure that it can, but the definition requires to be capable of being supported by the united features of the structure, which, were one to separate species on one character, would often prove not to be the case. To try and establish genera on a single feature is bound to lead to an unnecessary multiplication of genera, and in some cases to a failure to recognise how widely separated one genus may be from another. As an example I may refer to the generic revision of the species of *Epinephele* by Mr. P. A. H. Muschamp in this magazine in 1915. Here Mr. Muschamp takes Dr. Chapman's remark more or less literally, and sets out to divide the species on the characteristics of the uncus alone. He evidently was not too satisfied with the result, for we soon find him making references to other parts of the genitalia as well; and indeed, if one did not do so, it would not be possible to draw up a definition which would enable one to separate *narica*, *tithonus* or *lycaon* from *Erebia*, and the further one extended one's researches the more hopeless would the confusion become. In this paper, however, I am only concerned with clearing the position of the genus *Erebia*, and those species which have been erroneously included in it from time to time. All the same, from the little I have done, it seems that it would be possible, and of considerable use, to define the whole of the Satyrid genera on a similar basis; but if this were done it would probably necessitate the use of a slightly greater number of characters than I have employed, to ensure a correct representation of the very varied elements included in so wide a field of observation. I have included the genera *Oeneis* (as represented by *glacialis*, Moll.=*aello*, Esp.) and *Coenonympha*, in these notes; but, of the latter, I have only dissected a very few species, just a sufficient number to enable me to derive the fullest value from Mr. Muschamp's detailed paper on this genus (*Mittl. Ent. Zurich.* Heft I. 1915). A comparison of *Oeneis* was necessary, for Elwes' *Erebomorpha* (erected for *parmenio*) comes closer to *Oeneis* than any other genus.

After drawing up definitions for these genera, it became evident that, although a reader might appreciate that these genera were separable, yet he would scarcely grasp the real significance of the differences, or be able to visualise clearly how great these differences are in some cases. The latter is a very important point, recalling the fact that some present day writers would unite all the species of the four genera we are considering, in one genus. I have therefore tabulated my definitions in a diagrammatic manner, which will enable any reader to see at a glance the relationship between the various

genera. It is only necessary to follow down the lines of each genus, where the generic features of each character, as occurring in that genus, are marked by the presence of an asterisk. By a comparison of the position of the asterisks it is at once obvious at which points any two genera are alike, and where they differ. Thus, it will be seen that in *Erebia* and *Callerebia*, out of the eight selected characters, in only three do they coincide; *Callerebia* therefore shows only a similar number of points of contact with *Erebia* as *Coenonympha* does, and is further removed from *Erebia* than *Oeneis* is; the latter exhibiting four features in common with *Erebia*. It will be noticed that in character 4, none of the genera given develop the second feature described. This feature, however, is very marked in other Satyrid genera, so was included just to demonstrate that the diagram, as it stands, cannot be applied to all Satyrids, but would require adding to.

Paralasa comes nearest to *Erebia* but stands away from it in 3 and 8, the latter point especially being very distinctive, the horizontal development of the shoulder processes being peculiar to the genus. (Of course it may possibly occur in some of the other genera which I have not examined.) The position of *Erebomorpha* is very interesting, standing nearer to *Oeneis* than *Erebia* (a fact corroborated by the short antennae) though being very close to both: it differs from *Erebia* in 1 and 6, and from *Oeneis* only in 3. This, although probably unexpected by most people, fully justifies Elwes in taking *parmenio* out of *Erebia*. A very remarkable feature in both *Erebomorpha* and *Oeneis* is, that while the uncus is shorter than the tegumen in length, the two together are of greater length than the clasp. This combination is not what would be expected, the usual combination of these features being that shown by *Callerebia*.

In the selected characters, two of the names I have used require a word of explanation. First: the "brachia"; in this I am merely following Mr. Muschamp, who designated the lateral arms of the uncus in this very appropriate manner. Second: the "lateral lobes"; this term I have adopted for those side pieces, strongly developed in many Satyrid genera, which extend distally from each side of the saccus.

Some surprise may be felt that I have not made further use of the very remarkable formations exhibited by the brachia, but the specialisation of these structures cannot possibly be held to offer features of generic value, and if adopted would break the genus *Erebia* (*sens. rest.*) into at least 4 genera, a proceeding for which there is no support to be found elsewhere.

The classification of the species of *Erebia*, *Callerebia*, *Paralasa* and *Erebomorpha* by my definitions, as tabulated, gives one a very natural grouping; the species of the four genera being easily recognised by their superficial facies, while other structural details corroborate the arrangement, which works out as follows.

Erebia, Dalm.:—This will include all the European species with the exception of *phegea*, Bkh. (=*afer*, Esp., which falls as a primary homonym to *P. afer*, Drury, *Ill. Nat. Hist.*, III. 1782), and those N. American and Asiatic species which agree superficially with the European ones. The only change is the removal of *phegea* to *Callerebia*, and this will scarcely surprise any student of the true Erebias, for the superficial facies of *phegea* never really agreed with typical Erebias. As to its position in *Callerebia*, it might not strike

the eye of a casual observer, yet it will be seen on comparison that the markings and the nature of the spots, with their large black centres and narrow, even rings of colour, show much greater affinity with *Callerebia* than with *Erebia* ; as the formation of the forewings does also, though the hindwings are less typical of *Callerebia*, and in size *phegea* is considerably below the average. Still when one considers how far *phegea* has strayed, both east and west, from the original home of its kind in the Himalayas, it is not to be wondered at if the changed conditions have necessitated some modifications in the type. The genera *Oreina*, Westw., and *Melampias*, Hb., fall to *Erebia* ; were they added to the diagram they would be seen to coincide with it at every point.

Erebomorpha, Elwes :—*parmenio*.

Paralasa, Moore :—*kalinda*, *mani*, *maravandica*, *hades*, *discalis*, *semenori* and *shallada*.

The position of the last three I have not verified myself by dissection, but it seems fairly certain that they belong to *Paralasa*.

Callerebia, Butlr. :—The usual species ; *annada*, *scanda*, *nirmala*, etc., etc., also *phegea*, and *pratorum* and *saxicola*. The two last have been separated in the genus *Loxerebia*, Watkins ; and although they form a distinctive group separable by certain characters of the genitalia (*i.e.*, those of the clasp) yet were *Loxerebia* added to the diagram it would fall with *Callerebia* at every point.

I may here add, that the general features of the clasp (apart from the one given at No. 8) are so unstable as to be of no generic value, though very helpful for the natural groupment of the species within a genus : *i.e.*, I have divided the species of *Erebia* into 13 groups on the characters of the clasp, which is helpful in the systematic treatment of the genus, but I need hardly add, as 13 separate genera would be merely absurd.

The position of *herse* is doubtful. I only know the genitalia of this species from Dr. Chapman's drawing of it (*Trans. Ent. Soc. Lond.* 1898, pl. 16, f. 60). It is always almost impossible to gather details of the formation of the aedeagus, penis-sheath, or lateral lobes from drawings, even such good ones as are given by Mr. Muschamp, in his paper on the *Coenonympha*, but in the case of Dr. Chapman's, as he does not give the entire armature, it is quite out of the question. The portion he does show, however, suggests that *herse* must stand quite apart from any of the genera under consideration.

The same may be said of *myops* ; which Mr. Muschamp has placed in a separate genus : *Dubierebia*. Not having dissected this species, I can only say that, judging from Dr. Chapman's drawing again (*l.c.*, pl. 16, f. 56a) *myops* falls with *Coenonympha* in characters 1-4 ; and as the agreement of the features of 1 and 2, as seen in *Coenonympha*, is very unusual, and the character of the brachia (4) also unusual—though not quite so much so—it seems very probable that the remaining features 5-8 will agree with *Coenonympha* also, but one cannot say for certain.

In conclusion I may point out again that this grouping is corroborated by other characteristics, such as the shape of the hindwing in *Paralasa* differing from that of *Erebia*, and other superficial features ; and I think it can be said to demonstrate quite conclusively that these four genera are fully worthy of separation.

Selected Characters.	Generic Features.	Erebia.	Callerebia.	Paralasa.	Erebiomorpha.	Oeneis.	Coenonympha.
I. Development of combined tegumen and uncus.	Together longer than clasp.		*		*	*	
	Together shorter than, or equal to clasp.	*		*			*
II. Development of uncus.	Longer than tegumen.		*				*
	Shorter than, or equal to tegumen.	*		*	*	*	
III. Formation of uncus.	Dorsal ridge straight or slightly convex.	*	*		*		*
	Dorsal ridge strongly convex.			*		*	
IV. Development of brachia	Parallel with uncus, dorsal edge flat or slightly concave.	*	*	*	*	*	
	Approximately parallel with uncus, dorsal edge deeply concave.						
	Directed obliquely to, & passing above uncus, dorsal edge flat.						*
V. Formation of aedeagus.	Straight or undulating.	*		*	*	*	*
	Bent centrally, almost in right angle.		*				
VI. Development of penis-sheath.	Strongly developed.	*		*			
	Weakly developed or nearly wanting.		*		*	*	*
VII. Development of lateral lobes of saccus.	Strongly developed.	*		*	*	*	
	Weakly developed.		*				
	Wanting.						*
VIII. Development of shoulder processes of clasp (when present).	Directed vertically.	*	*				
	Directed horizontally.			*			